R E P O R T R E S U M E S

ED 011 068 08

RESEARCH AND DEVELOPMENT IN VOCATIONAL AND TECHNICAL EDUCATION--NON-METROPOLITAN AREAS.

BY- THOMAS, ROBERT W.
IOWA STATE UNIV. OF SCIENCE AND TECH., AMES

REPORT NUMBER ERD-255-1 PUB DATE NOV 66
REPORT NUMBER BR-5-0045-1
CONTRACT OEC-5-85-108
EDRS PRICE MF-$0.18 HC-$2.76 69P.

DESCRIPTORS- RESEARCH COORDINATING UNITS, *VOCATIONAL EDUCATION, *TECHNICAL EDUCATION, *RURAL AREAS, *RESEARCH AND DEVELOPMENT CENTERS, *EDUCATIONAL RESEARCH, HUMAN RESOURCES, OCCUPATIONAL GUIDANCE, EDUCATIONAL RESOURCES, EMPLOYMENT OPPORTUNITIES, AMES

A STRATEGIC INTELLIGENCE UNIT AND A RESEARCH ACTIVITIES UNIT WERE THE TWO MAIN COMPONENTS OF THIS PROJECT FOR RESEARCH AND DEVELOPMENT IN PROBLEMS OF VOCATIONAL AND TECHNICAL EDUCATION FOR NONMETROPOLITAN AREAS. PROBLEM CONCEPTUALIZATIONS AND INTERDISCIPLINARY RESEARCH WERE THE ACTIVITIES OF THESE TWO PROJECT COMPONENTS. THE PRIMARY FUNCTION OF THE STRATEGIC INTELLIGENCE UNIT WAS TO PROVIDE INFORMATION REGARDING VOCATIONAL AND TECHNICAL EDUCATION AND TO CONCERN ITSELF WITH PERCEPTION, ASSESSMENT, AND ARTICULATION OF THE EXISTING SOCIAL ENVIRONMENT AS IT IMPINGES UPON VOCATIONAL AND TECHNICAL EDUCATION. THE RESEARCH ACTIVITIES UNIT, DESIGNED TO RESEARCH PROBLEMS OF EDUCATION FOR NONMETROPOLITAN AREAS, PURSUED ACTIVITIES IN HUMAN RESOURCE DEVELOPMENT, OCCUPATIONAL OPPORTUNITIES, AND EDUCATIONAL RESOURCES DEVELOPMENT AND TRAINING. THE APPENDIX TO THIS REPORT IS ED 011 069. (GD)

ED011068

ERD-255

Interim
~~FINAL~~ REPORT
Project No. ~~ERD-255~~ 5-0045-1
Contract No. O. E. 5-85-108

U. S. DEPARTMENT OF HEALTH, EDUCATION AND WELFARE
Office of Education
This document has been reproduced exactly as received from the person or organization originating it. Points of view or opinions stated do not necessarily represent official Office of Education position or policy.

RESEARCH AND DEVELOPMENT IN VOCATIONAL AND TECHNICAL EDUCATION: NON-METROPOLITAN AREAS

November 1966

U.S. DEPARTMENT OF
HEALTH, EDUCATION, AND WELFARE

Office of Education
Bureau of Research

RESEARCH AND DEVELOPMENT IN VOCATIONAL AND TECHNICAL EDUCATION: NON-METROPOLITAN AREAS

Project No. ERD 255
Contract No. O. E. 5-85-108

Robert W. Thomas

November 1966

The research reported herein was performed pursuant to a contract with the Office of Education, U.S. Department of Health, Education, and Welfare. Contractors undertaking such projects under Government sponsorship are encouraged to express freely their professional judgment in the conduct of the project. Points of view or opinions stated do not, therefore, necessarily represent official Office of Education position or policy.

Iowa State University of Science and Technology

Ames, Iowa
50010

TABLE OF CONTENTS

		page
I.	INTRODUCTION	1
	A. Problem	1
	B. Purpose	3
	C. Objectives	3
II.	METHOD	3
III.	RESULTS	4
	A. Strategic Intelligence Unit	4
	1. Inter-disciplinary Interaction	4
	2. Problem Conceptualization	4
	3. Group Activities	11
	B. Research Activities Unit	14
	1. Activity One	21
	2. Activity Two	21
	3. Activity Three	23
	4. Activity Four	23
	5. Activity Five	24
	6. Activity Six	25
	7. Activity Seven	25
	8. Activity Eight	25
	C. Project Results	26
IV.	DISCUSSION	27
	A. Strategic Intelligence Unit	27
	B. Research Activities Unit	33
	C. Project Discussion	38
V.	CONCLUSIONS AND IMPLICATIONS	40
	A. Strategic Intelligence Unit	40
	B. Research Activities Unit	44
	C. Project Conclusions and Implications	51
VI.	SUMMARY	52
	A. Strategic Intelligence Unit	52
	B. Research Activities Unit	53
	C. Project Summary	56
VII.	REFERENCES	58
VIII.	APPENDIX OF RESEARCH REPORTS	62

ACKNOWLEDGEMENTS

For their editorial assistance, the author[1/] wishes to thank John Heer, Ann Hull, Virgil Lagomarcino, Lois McCormick, John Mahlstede, William Stucky, and Carolyn Taff.

For the substantive stimulation reported, the author wishes to thank the membership of the Strategic Intelligence Unit and its consultants.

1/ Robert W. Thomas, Associate Professor of Economics, Department of Economics, Iowa State University, Ames, Iowa; and Chairman, Strategic Intelligence Unit of the Project for Research and Development in Vocational and Technical Education: Non-metropolitan Areas.

I. INTRODUCTION

This final report from the project for research and development in vocational and technical education for non-metropolitan areas has been prepared as a synthesis of the total project which had two main components: (1) the Strategic Intelligence Unit, and (2) the Research Activities Unit composed of eight research activities.

Work of the two principal components appear as significant divisions of this report.

A. Problem

A multitude of political, social, and economic changes are affecting the United States population, including non-metropolitan areas. Problems of vocational and technical education in non-metropolitan areas deserve special attention. Certain problems are magnified in non-metropolitan areas. Some of these are unique. For example, many non-metropolitan areas are poor in productive resources. Financing education becomes a burden difficult to bear. Also, problems arise because of rural migration.

Non-metropolitan area citizens need educational help to interpret changes of which they are a part. Residents capable of profiting from it need vocational and technical training and retraining to face the changing world of work.

Among rural changes to be interpreted are losses of population.

To illustrate how migration has occurred, the farm labor force itself has declined by 45 per cent or 4½ million over the past 25 years (13).

Projections indicate only one farm boy out of every 15 can actually be employed in farming during the next 20 years (14). Research suggests that 40 per cent of farm operators must find off-farm employment opportunities over the next 20 years (14). While 40 per cent of the males in agriculture will leave agriculture in the next decade, the rate is projected to be as high as 75 per cent for those in the 15-24 age group and as low as 1 per cent for those in the 45-65 age group (14). Unless important retraining programs can be created for such persons, many will be trapped in farming at low incomes. Under-employment is higher and human productivity much lower in agriculture than in industry (14).

Further, in towns dependent upon primary agriculture, the major portion of the labor force fares no better than the farm families.

Though the land in farms does not decrease appreciably, the number of farms does. Between 1940 and 1960, the number of farms declined 39 per cent. A further 67 per cent decline is expected by 1980 (14). Moreover, the skills required to operate a farm in the future will differ greatly from those of the past.

Business, services, and social institutions in the rural community are having to make changes of the magnitude as those taking place in farming. The exodus of the farm population leaves fewer customers to be served by the merchants and institutions of the rural town; consequently fewer workers are needed in the rural towns. Moreover, economic growth and the substitution of capital for labor affect the rural town and rural social institutions as well as the outlying farms. The same forces which have led to larger and fewer farms, economic growth and a decline in the price of capital relative to labor, call for larger and fewer business establishments servicing the farming industries as well as larger and fewer public institutions, and larger and fewer firms servicing rural communities.

People in the non-metropolitan areas must make great occupational and geographic adjustments to national economic growth and change. This forced adjustment can be expected to continue in rural America over future decades. Further, in undergoing this adjustment these people have a great present disadvantage in vocational and technical education, and frequently in general education as well. The number of high school dropouts from non-metropolitan areas is high (2^2). Financial support for training was found to be weak. Local on-the-job training facilities were scarce. And employment opportunities were few in number in these non-metropolitan areas (22).

Rapid economic growth is making obsolete the rural community as it once existed. It will become progressively more obsolete when more and more jobs are taken over by machines and automated production schemes in larger cities. Rural areas are becoming over-equipped with towns, local governments, churches and businesses as they are with laborers. Technological change and economic growth have given rise to economics in large scale operations. As a result the town business and community institution have been affected as well as the farm. Thus the business, educational, governmental, and other communities must be spread over much more space and serve more people if they are to be economically viable in the next 30 years. These redirections all

bring changing requirements with respect to employment opportunities and training needs. Yet, until recently, this non-metropolitan sector of the economy was almost untouched by national efforts to upgrade its socio-economic opportunity.

B. Purpose

The purpose of this project was to establish an organization of two principal components to undertake inter-disciplinary studies of problems associated with vocational and technical education in non-metropolitan areas. The two components for inter-disciplinary studies of vocational and technical education problems were the Strategic Intelligence Unit and the Research Activities Unit. Through these two structures this project engaged in examination and analysis of priority problems of vocational and technical education in non-metropolitan areas of the United States.

A Standard Metropolitan Statistical Area (SMSA) is defined by the Bureau of the Census as follows: A county or group of contiguous counties (except in New England) which contains at least one central city of 50,000 inhabitants or more or "twin" cities with a combined population of at least 50,000. In addition to the county, or counties, containing such a city or cities, contiguous counties are included in an SMSA if, according to certain criteria, they are essentially metropolitan in character and are socially and economically integrated with the central city. In New England, towns and cities are the units used in defining SMSA's (32).

C. Objectives

The objectives of this project were to analyze problems surrounding vocational and technical education in non-metropolitan United States by means of two related organizational forms: (1) the Strategic Intelligence Unit, and (2) the Research Activities Unit.

II. METHOD

Methods of operation within the project varied between principal organizational components.

Under the Research Activities Unit was undertaken inter-disciplinary research in vocational and technical educational problems in non-metropolitan areas.

Under the Strategic Intelligence Unit inter-disciplinary "brain-storming" sessions and special work sessions were used for creative conceptualization of problems associated with vocational and technical education for non-metropolitan area people.

During the contract period from June 1, 1965 through November 30, 1966, this project focused upon priority problems within the setting surrounding vocational and technical education for non-metropolitan areas. The Strategic Intelligence Unit worked on the problem setting. The Research Activities Unit undertook eight specific activities.

Problems arising within the non-metropolitan town-rural complex of the United States were the main concern, with emphasis placed upon Midwest non-metropolitan areas.

III. RESULTS

A. Strategic Intelligence Unit

1. Inter-disciplinary Interaction. The Strategic Intelligence Unit began inter-disciplinary analysis of vocational and technical education, studying society-wide justifications for training for the world of work in order to establish fundamental concepts useful to discussion and research.

This Unit, listed in Table 1, interacted with its membership and with the consultants to gain inter-disciplinary understanding of vocational and technical educational problems.

2. Problem Conceptualization. To aid conceptualization of problems and evaluation of preparation for the world of work, examining man's realized and unrealized social, economic, legal, and educational goals together with philosophies from which they sprung was considered an important part of the group's work. Through this broad approach it was believed new applications of current theory and alternative solutions to present training problems could emerge.

Generation of a set of concepts and a framework for continuous and long-term study was begun. These concepts and the framework could be used in future analysis of problems of vocational and technical education for non-metropolitan areas.

Taking the necessary broad view in the beginning of analysis and conceptualization reminds one that in dealing with the fundamental development of human beings over time, space, and socio-economic class, one must recognize existence of numerous complex

Table 1. STRATEGIC INTELLIGENCE UNIT, Iowa State University, Ames, Iowa

MEMBER	IOWA STATE UNIVERSITY POSITION
Dr. Ernest Anderson	Distinguished Professor & Head - Aerospace Engineering
Dr. George Beal	Professor - Sociology
Dr. Donald Boles	Professor - History, Government & Philosophy
Dr. George Browning	Associate Director - Agriculture & Home Economics Experiment Station
Dr. Ray Bryan	Professor & Head - Education
Mr. Clarence Bundy	Professor - Education
Dr. Lowell Carver	Professor - Education
Dr. Earl Heady	Distinguished Professor - Economics
Dr. Trevor Howe	Associate Professor - Education
Dr. Virgil Lagomarcino	Professor & Director - Teacher Education
Dr. Edwin Lewis	Associate Professor - Psychology
Dr. John Mahlstede	Assistant Director - Agriculture & Home Economics Experiment Station
Dr. Marguerite Scruggs	Assistant Dean - Home Economics Administration
Mr. William Stucky (Sec.)	Education Leader - Center for Agricultural and Economic Development
Dr. Robert Thomas (Chr.)	Associate Professor - Economics

variables: (1) the human population, (2) the existing physical constraints, (3) the existing societal constraints, (4) the interaction of each of these with the other, and (5) the interaction of the first three.

At the start, one recognizes: (1) the human variable, (2) the geographic variable, and (3) the cultural and social variable. Each of these complex variables contains within it certain fixed and variable attributes depending upon the time period one allows for analysis. The long-run would see no fixed attributes. For example, an individual has an inherited set of attributes not clearly known and specifically specified at this particular time, but inherited attributes nontheless. Quite possibly these are changeable with research and development of human beings over time. This is one illustration of the importance of time to the analysis.

In beginning an exploratory model for vocational and technical education problems (problems which are, of course, a part of the total set of social problems), one would consider the human resources with their inherited attributes and their social constraints, the geographic or physical constraints, the cultural and social milieu as constraints, and then time. One could conceive of four general and broad variables in the original conceptual model.

Continuing with this approach one can recognize a "function", and an "organization." Hence, for the concept education, and for vocational and technical education, one can discuss concepts of "functionalism" and of "institutionalism".

Within the functional and institutional concepts, one can characterize education as change in the human being which is brought about by his interaction over time with (1) the structure, (2) other human resources, (3) the social milieu, and (4) the geography of his environment. This change through interaction may be of a formal or of an informal nature. It may be quite direct and obvious or quite subtle and not easily noticed.

The function of education is development of human beings. This function can be formal, informal, insidious, subtle, direct, obvious, "good", or "bad." In a changing society such as ours the ends, goals, and objectives of "functional" education or of "institutional" education may be evaluated as "good" in one period and "bad" in another, depending upon the evaluator, the situation, or the priorities assigned to different attributes of an education.

The ingredients of a conceptual model over time consist, then, of (1) the human resources, (2) the geographic attributes, (3) the social and cultural attributes, (4) the "functioning" educational process for the "civilization" of the human input (a "civilization" defined in terms of dominant societal goals and needs within the existing social and institutional structure).

Take just the first variable, the human resource alone. It has a direct impact upon the social systems, the institutions, the dominant societal goals, and the needs of society. Given the characteristics and socio-economic classes of people, the human resource may act directly or it may act indirectly (through modifying variables) upon these four items. Between human resources, social systems, and social goals exist, with varying significance over class, certain intervening variables which further modify the impact of a given human resource upon a given social system, order, or structure.

Then, in turn, the social systems, orders, structures, and institutions perform certain functions for and against sub-sets of the human resource. Certain indirect and direct modifications arise.

With the permissiveness of modern United States society and the constant change of the 20th century, dominant societal goals and needs are shifting. This needs to be recognized in a dynamic model dealing with the total "functionalism" and "institutionalism" of education of which vocational and technical education is a part.

A model for analysis of vocational and technical educational development may be started in the following manner (based on committee work adopted by the Strategic Intelligence Unit.)

Vocational-technical educational development may be thought of as a dependent variable, "Y". Each of the following may be symbolized, and are variables affecting "Y": human resources (X_1), social systems and institutions (X_2), dominant societal goals and needs (X_3), together with intervening variables, between human resources and social systems (X_4), and between social systems and dominant societal goals (X_5).

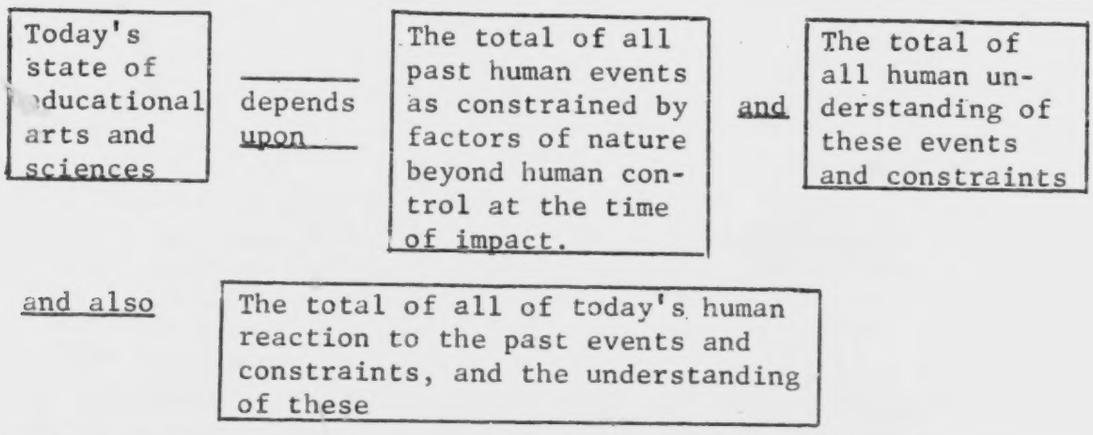
Then the following formal statement is conceived:

$$Y=f(X_1, X_2, X_3, X_4, X_5).$$

Many variables modify the characteristics of the human resources (X_1) and the functions of the social systems (X_2). Also the intervening variables between the human resources and the social systems (X_4) create another set of conditions. Between systems and goals (X_5) are yet more modifiers of the training process. Further, these variables possess reciprocal influence on each other. Finally, external "constraints" influence the whole system.

Figure 1 is a concept of relationships affecting today's education. This concept symbolizes today's state of educational arts and sciences. These are taken as the dependent variable, dependent upon the total of all past human events as constrained by factors of nature beyond human control at the time of impact, the second variable which is considered to be the total of all human understanding of these events and constraints, and a third variable which is the total of all of today's human reactions to the past events, to their constraints and to understanding of these constraints.

Figure 1. A Concept of Factors Affecting Today's Education


Today's state of educational arts and sciences
depends upon
The total of all past human events as constrained by factors of nature beyond human control at the time of impact.
and
The total of all human understanding of these events and constraints
and also
The total of all of today's human reaction to the past events and constraints, and the understanding of these

This concept given in Figure 1 emphasizes the total of past events and physical constraints beyond human power, total accumulation of knowledge and understanding about these, and the collective human reaction in the present period to the accumulated knowledge and the events. What this does is emphasize three aspects which are significant in any given time period or any given educational flow or system.

Though problem concepts of factors affecting today's education as discussed above and as shown in Figure 1 may be useful beginnings, these do little to alter immediate educational problems of the present. Hence this level of abstraction needs to be brought closer to present reality.

The process of relation to present reality could follow from the following considerations.

At any given time there exists a set of human resources which display collective and individual human reactions to past events and to present and past constraints. This set of human resources has beliefs and understandings of its collective self and of constraints. These are shown through social systems and institutions established and tolerated. These understandings and beliefs are shown by the kinds of dominant societal goals and needs which this human resource says it should seek.

In a dynamic sense one might say that educational development, including vocational and technical educational development, is a function of the human resources, the social systems and institutions and the dominant societal goals and needs as these are constrained by the external forces of the moment.

Taking this approach causes one to be concerned about past events, understanding of these events, and reaction to these events under three sub-groupings: (1) reaction and interaction with present human resources, (2) reaction and interaction with present social systems and institutions, and (3) reaction and interaction with dominant societal goals and needs of the present period.

Seeking to develop conceptualizations of problem areas surrounding vocational and technical education involves expanding materials discussed in such ways that priority areas of concern to people and leaders can be analyzed.

To lay aside confusion, the first step is to recognize that education has, in its broadest sense, two aspects: (1) a function and (2) an institutional structure. Looking at education in its functional sense, one can say that by defining education as "change with choice" is adequate. That is to say, the dynamic processes of life and matter over which man may exercise no control are beyond the range of this definition of education. However, within the definition are those processes which are at anytime affected by human beings and over which choice may be exercised. This choice may be regarding ones own activity or activities of others. This choice may involve changing the environment, changing an individual, or changing a group of individuals.

The function of education would be bringing about change, at rates and in areas, according to man's choosing. This includes the studying of how these changes occur to develop information which will expand man's range and choice. In other words, man may choose to study, act or do neither. The act of choosing is based upon a state of knowledge. This state of knowledge is a stock on which education draws. The flow, or dynamism, is the functionalism of education and is the process by which change is made by choice.

In dealing with human resources and modifying variables, problems of development of training programs lie in (1) considerations of personal and social significance of work, (2) adult and continuing education, (3) occupational information, (4) career choices, (5) program evaluation, (6) curriculum experimentation, (7) personnel recruitment and development, and (8) program organization and administration.

Success and failure elements of various kinds lie within these priority areas. For example, ways in which human needs for adult and continuing education would be organized by use of

curriculum experimentation and program evaluation would contain success or failure elements depending upon goals and objectives of the society or sub-cultural group upon whom the activity is to be performed and for whom the activity is to be done.

Hence, the final need in the conceptual structure is a model for public policy which would permit relating the human resources to publicly acceptable and achieveable goals through media of social organization and informal, ad hoc gatherings. Therefore, each given sub-cultural group which is organized as a part of the total cultural system must have its objectives specified so that they are obtainable by the non-policy workers, or the technicians of the system. Furthermore, since sub-cultural social groups have multiple goals, and each goal has multiple alternatives for achievement, feasible means of achieving alternatives and explicit goals would be part of a model containing public policy objectives.

The preceding discussed generalized conceptual models which can form a background for serious examination of problems of vocational and technical education. Although the background and the variables within the generalized conceptual model are complex and numerous, it is urged that this not detract from an attempt to examine education, its functions, and its institutionalization. It is strongly recommended that the total and broad view be taken at the beginning so that there will be fewer piecemeal and ad hoc attempts to "solve" problems of vocational and technical education. Somehow examiners must come to grips with the total framework surrounding education in such a manner as to grip the functional and structural vocational and technical educational needs of our society.

If one takes a specified category of human resources (with their characteristic interests, attributes and aspirations) which may be oriented towards vocational and technical education (which is presumed here to be a non-baccalaurate goal), one can take this cluster of resources and move it through a vocational and technical educational structure designed to perform certain functions and which is adapted to the achievement of certain ends and objectives. These ends may or may not be specifically aligned with those of the resource input. However, the ends are certainly aligned with those of the decision makers for the structure. One may hope that the decision makers for the structure and the aspirations of the cluster of human inputs into the structure might be similar. If this is the case, and if adequate analysis of a cost-benefit nature can be performed, optimum development of work abilities could be generated.

Though elements of conceptual models may interact and influence other elements, it does not occur all at the same time. The time path of action and reaction presumably could be traced. A dynamic model suggests a means of seeing relationships of vocational and technical education to related components of society.

3. Group Activities. The role of the Strategic Intelligence Unit was creative analytic thinking about the problem setting for vocational and technical education for non-metropolitan areas. To attack these problems, the inter-disciplinary Strategic Intelligence Unit of 15 members sought outside assistance and interacted with its own membership to achieve an inter-disciplinary structure under which vocational and technical education could be examined.

This group held bi-monthly seminars and devoted its efforts to defining problem areas, and identifying relevant research activities.

The group noted the problem setting for vocational and technical education as consisting of four principal components: (1) unrealized human, social, and economic goals; (2) existing laws, programs and educational philosophies; (3) past and current theory in research findings; and (4) alternative solutions.

The Unit analyzed in depth problems of vocational and technical education in non-metropolitan areas, thinking creatively in this analysis about the problem framework, the problem context, and the analytic framework.

In performance of its role, the Unit interacted informally to develop a spirit and rapport which would make possible a free flow of inter-disciplinary discussion regarding problems of vocational and technical education. Because of the nature of the training of the membership and the customary orientation toward a discipline approach, an inter-disciplinary approach was achieved, but not readily achieved. Considerable effort on the part of the group was necessary in order to achieve an effective inter-disciplinary consideration of problems surrounding vocational-technical education and problems of specific vocational and technical educational needs.

Work of the members during and between meetings brought the following results. The Strategic Intelligence Unit, received, reviewed and discussed: (1) materials from the United States Office of Education, (2) materials relating to priority needs for research and exploration, (3) materials related to definitions of terms and work areas under the Vocational and Technical Education Act of 1963, (4) reports on definitions of terms, (5) reports

dealing with priority areas for research and development, (6) items on research and development activities, (7) analyses of the total problem context for vocational and technical education, and (8) statements of purposes of adult and vocational educational training.

Definitions of parameters of the Unit work under the vocational and technical educational problem were discussed. The Unit's problem was defined as two-fold: (1) to suggest kinds of training opportunities now needed and not available, and (2) to seek to arrange in priority fashion the kinds of trainings which would have the highest payoffs to society. To assist in understanding these two tasks, speakers were arranged.

Dr. Selz Mayo, North Carolina State University, Raleigh, North Carolina discussed problems of occupational training and organizing centers of study. Ways in which regional and national work could be developed were discussed.

A discussion of vocational educational needs in agriculture, needs in agricultural education,was led by Mr. Clarence Bundy. Mr. Bundy discussed (1) Iowa's survey of farmer replacement needs for Iowa, (2) factors related to the occupations of Iowa farm male high school graduates, and (3) competencies in agriculture needed by males employed in retail farm machinery distribution. Qustions regarding the rigidity of training within vocational education arose. A further problem included relationships of colleges to junior colleges and to vocational school programs to be developed in area vocational schools. Questions were raised on who is going to provide adult educational training and informal educational assistance needed by the farmer of tomorrow.

Dr. Trevor Howe and Dr. Robert Thomas attended meetings in Minneapolis, Minnesota to discuss occupational education problems, to review research and development resources available, to consider how a regional educational laboratory can contribute to research and development activities, and to make recommendations on programs and functions.

Dr. Donald Boles reported on governmental implications of area vocational-technical schools in the state of Iowa. The crucial variable identified in the governmental framework was the implementing strategy. Questions of who made decisions for vocational and technical schools on their programswere discussed.

Mr. Waldo Wegner, director of the Center for Industrial Research and Service, Iowa State University, Ames, Iowa, discussed demands for vocational and technical education skills within

the state of Iowa, particularly those demands of smaller companies for workers in categories such as machinists, draftsmen, welders, and supervisory personnel. Smaller companies are unable to embark on their own training programs. These firms would like to be able to cooperate with schools on training programs. Union rules of apprenticeship create certain conditions regarding free entry and easy access to certain technical activities. Five areas of training were discussed: (1) training to achieve individual and initial productivity, (2) training for renewal, (3) training for professional improvement and for promotion in professional activities, (4) adult education which enables institutional reform to develop, and (5) training of the retarded.

Dr. Neal Gross discussed problems involving developing policies relevant to vocational and technical training. Focusing on the non-metropolitan areas he believed to be important. Hopefully, the vocational and technical educational research will provide meaningful education for the disadvantaged of the population. Questions of job realism of intensity of study and of interest were raised. Urban youth frequently have very low occupational realism. This may be true of rural youth. Though young people are eventually going to migrate from agriculture, little knowledge is held of what the jobs will be like or of where the jobs are.

Dr. Harold Ellis, Director of the Technical Institute, Iowa State University, Ames, Iowa, discussed vocational-technical needs from the standpoint of the institute. Problems discussed included: (1) programs of study, (2) automation, (3) intermediate and long run values of programs, (4) the individual's ability and achievement, (5) the questions of family background, and (6) the impact this has on individual motivation.

Dr. Murphy, discussed problems associated with vocational and technical education and the measurement of educational programs. Dr. Murphy, who is operations research analyst, National Bureau of Standards, Washington, D.C. discussed her work dealing with the effect of technology on manpower development and utilization.

Dr. Murphy, in her particular work, surveyed counsellors in six cities to see what they considered to be the needs of forecasting and the uses of technological information forecasting. Counsellors were eager to receive the information, but not certain how it might be applied or used by students. Differences among students and their need for different time perspectives became part of the discussion.

Dean Helen LeBaron discussed problems of vocational and technical education based on her experience. Discussion included: (1) continuation school for young people who ordinarily do not go to school or would go only part of a day and work the balance of the day, (2) upgrading vocational and technical education, and (3) technical institutes developing around the country.

Problems of gaining concensus were discussed. Where schools for vocational and technical education should be located, and how they should be administered were discussed.

The United States has had problems in being successful with vocational programs. In general, students who are attracted to vocational and technical educational programs have not had a great deal of success in typical tradition academic programs. Some changes have occurred which partly arise from the change in philosophy regarding vocational and technical education. The Job Corps has been developed. Programs for people who do not go to college have been developed. However, prestige of the training is a problem factor in these. Problems of women (who seem to be the forgotten group) in vocational and technical education were discussed.

Mrs. Barbara Rougvie and Dr. Alberta Hill, acting for Dr. Scruggs, reported on their study of vocational and technical education. Discussed were differences of opinion on meanings of vocational and technical education, and how different pieces of federal legislation affected vocational and technical training.

Major group activities and their results are summarized in Table 2.

B. Research Activities Unit

The Research Activities Unit carried out research on problems related to vocational and technical education for non-metropolitan areas in the following categories: (1) human resources development, (2) occupational opportunities assessment, and (3) educational resources development and training. Table 3 lists research activities and leaders.

The Research Activities Unit was organized and placed under the direction of Professor John P. Mahlstede. Results of the research activities funded under this project are reported by activities.

Each of the eight research activities has a detailed and separate report in the appendix. Within this portion of the

Table 2. CHRONOLOGY OF STRATEGIC INTELLIGENCE UNIT ACTIVITIES

WHAT	WHEN
1. 14 member Strategic Intelligence Unit formed by Drs. George Browning and Virgil Lagomarcino.	Between July 1, 1965 and September 30, 1965
2. Selection of Dr. Robert W. Thomas as Unit Chairman.	October 10, 1965
3. First meeting This meeting acquainted individuals with the general purpose of the Strategic Intelligence Unit: to analyze in depth, and in an unstructured fashion (creatively and imaginatively) the total problem context surrounding vocational and technical education.	October 15, 1965
4. **Second meeting** This meeting discussed what would be natural problem clusters and a framework for problem clusters, separating various components of the vocational and technical educational problem. The Unit decided to seek definitions and parameters to the problem context of vocational and technical education.	October 29, 1965
5. Third meeting This meeting with Selz Mayo discussed work at North Carolina State University, Raleigh, North Carolina, taking up organizational structure as well as research and development programs.	November 5, 1965
6. Fourth meeting This meeting dealt with problems of specifying research goals in vocational and technical education.	November 19, 1965

Table 2. (continued)

WHAT	WHEN
7. Fifth meeting This meeting dealt with vocational and technical educational roles, definitions, and philosophies.	December 14, 1965
8. Sixth meeting This meeting dealt with research and development needs in vocational and technical education, discussing the possibility of certain members preparing supplementary reports.	January 14, 1966
9. Seventh meeting This meeting continued discussion of supplementary reports on problems in vocational and technical education.	January 28, 1966
10. Eighth meeting This meeting heard the first report from Mr. Clarence Bundy on vocational and technical educational problems in vocational agriculture.	February 11, 1966
11. Ninth meeting This meeting heard a report from Dr. Alberta Hill regarding concepts and problems in vocational and technical educational research.	February 25, 1966
12. Tenth meeting This meeting received a report from Professor Donald E. Boles, professor of political science, who discussed political science considerations in development of the new area vocational school districts of Iowa.	March 11, 1966

Table 2. (continued)

WHAT	WHEN
13. Eleventh meeting This meeting heard a report from Mr. Walter Wegner, Director of CIRAS, Center for Industrial Research and Service, Iowa State University, Ames, Iowa, on the problems faced by industry in the State of Iowa pertinent to vocational and technical educational needs.	March 25, 1966
14. Special meeting This special meeting heard a report from Professor Neal Gross, Professor of Sociology, Harvard University, Cambridge, Massachussetts, on problems of vocational and technical educational development based on his research and experience. General problems of concern: (1) migratory characteristics of agricultural youth, (2) the critical stages for decision making by youth, (3) job awareness, (4) job realism, (5) the home environment, (6) the counsellors and their state of knowledge, and (7) the willingness of the parent group to provide environment for the development of the youth.	April 6, 1966
15. Twelfth meeting This meeting heard a report from Dr. Harold Ellis, Director of the Technical Institute of Iowa State University, Ames, Iowa, explaining vocational-technical educational needs in his program as he sees them for the two year sub-baccalurate people interested in becoming skilled	April 8, 1966

Table 2. (continued)

WHAT	WHEN
technicians in engineering and allied areas. Problems pointed out were (1) concepts of vagueness in and about training programs, (2) problems of automation, (3) inability to measure one's creative as well as one's intellectual capabilities, (4) problems of family background and (5) job awareness on the part of the family and the student.	
16.Special meetings	March & April, 1966
These special meetings between Chairman Thomas and Dr. Edward Jakubauskas, Dr. Vaughn Manley, and Mr. Allen Jensen, all of the Iowa State Manpower Development Council, Des Moines, Iowa, dealt with problems in development of vocational and technical education, and relationships which might develop between the Iowa Manpower Development Council and the Strategic Intelligence Unit. Also raised were ideas on developing working relationships between the Strategic Intelligence Unit and the Industrial Relations Center, Iowa State University, Ames, Iowa, to be under the direction of Dr. Jakubauskas upon his return from Des Moines to the campus in Ames. Chairman Thomas discussed with Dr. Russell Mahan, Sociologist specializing in human relations, Iowa State University, Ames, Iowa, ways in which conferences with action agencies might be integrated with the work of the Strategic Intelligence Unit.	

Table 2. (continued)

WHAT	WHEN
17. Thirteenth meeting This meeting discussed with Dr. Evelyn Murphy her work on the effects of technology on manpower development and how it is related to vocational and technical education. Dr. Murphy, Operations Research Analyst for the Institute of Applied Technology, National Bureau of Standards, Washington, D.C., is concerned with forecasting technological innovation, developing processes of forecasting and concerned with socio-political consequences of technological change. She seeks ways in which the forecasting work can be related to school counseling and student problems. Occupational choice is a process of remaking and unmaking decisions, and technological forecasting can be of assistance in indicating what is likely in the labor market.	April 29, 1966
18. Fourteenth meeting This meeting discussed with Dean Helen LeBaron the problems and possibilities of vocational and technical education. The grade level placement of vocational and technical education is a problem. Technical institutes are blossoming and imagination regarding new approaches is needed. Isolation of skill clusters common to several jobs is needed. Special emphasis on women (a forgotten group) is needed in vocational and technical education.	May 6, 1966

Table 2. (continued)

WHAT	WHEN
19. Fifteenth meeting This meeting heard a report from Dr. Alberta Hill and Mrs. Barbara Rougvie dealing with developments, problems, and definitions of vocational and technical education. Polar positions in educational philosophy were stated. From these could be seen problems of access, problems of focus and emphasis, problems of development, and problems of implementation.	May 20, 1966
20. Sixteenth meeting This meeting discussed development of research reports for the United States Office of Education. Plans for the continuance of the work of the Unit were discussed.	September 2, 1966
21. Seventeenth meeting This meeting outlined reports due the United States Office of Education under contract O.E. 5-85-108.	September 20, 1966
22. Eighteenth meetimg This meeting heard from W. G. Stucky on the structure and future development of the Strategic Intelligence Unit.	October 7, 1966
23. Nineteenth meeting This meeting heard from Dr. Ernest Anderson on some problems of conceptualization of education and vocational and technical training as viewed by a special faculty	October 21, 1966

Table 2. (continued)

WHAT	WHEN
committee of Iowa State University faculty members.	
24. Twentieth meeting This meeting continued discussion of the material of the nineteenth meeting.	November 4, 1966

project final report, certain significant results from each research activity are given.

1. Activity 1. This activity dealt with the decision-making process of school districts regarding vocational education and training programs. It examined the nature and scope of school bond elections requesting funds for vocational and technical educational purposes.

Results of this research showed a complex process to exist for proposing and implementing school bond issues. The process involved many different actions and consultations with many different groups. Techniques and strategies varied widely and apparently depended upon the differences in specific target audiences.

Results of the analysis were based on percentage figures with per cent of affirmative vote chosen as the dependent variable. Results were obtained by analysis of voter turn-out and of interviews. Relationships were obtained through multiple regression analysis.

Among variables found significantly related to per cent of affirmative votes were: (1) the perceived importance of the citizens' advisory committees in planning and publicizing the bond issue campaign, (2) the perceived value of the parent-teacher association in the bond issue campaign, and the responsibility assumed by the superintendent and the Board of Education.

2. Activity 2. This activity dealt with occupational problems and vocational training needs of high school dropouts in rural Iowa.

Table 3. ACTIVITIES UNDER THE RESEARCH ACTIVITIES UNIT

Project Activity Number	Iowa State University Account Number	Research Activity Title	Principal Investigator (s)
1.	431-13-40	The Decision Making Process of School Districts Regarding Vocational Education and Training Programs	Virgil Lagomarcino George Beal
2.	431-13-41	Occupational Problems and Vocational Training Needs of High School Drop-outs from Rural Areas in Iowa	Trevor Howe
3.	431-13-42	Interrelationship of Home Environment and Employment	Marguerite Scruggs
4.	431-13-45	Manpower Requirements and Demand in Agriculture by Regions and Nationally, with Estimation of Vocational Training and Educational Needs and Productivity	Earl Heady
5.	431-13-43	Predicting Change in Technology, Jobs and Vocational Training Needs in Rural (Non-metropolitan) Labor Markets	Phillip Baumel Karl Fox
6.	431-13-46	The Potential Contribution of Psychology to Inter-disciplinary Research in Vocational and Technical Education	Edwin Lewis

Table 3: (continued)

Project Activity Number	Iowa State University Account Number	Research Activity Title	Principal Investigator (s)
7.	431-13-47	Determinants of the Post-High School Educational and Occupational Choices of Iowa Farm Boys	Donald Kaldor
8.	431-13-48	An Analysis of Legal and Political Problems and the Strategy Necessary for Implementing Programs Under the Vocational Education Act of 1963	Donald Boles Charles Wiggins

Results indicated that only in a few cases was the decision to leave school a spontaneous one for the dropout. For this reason dropping out has been sometimes referred to as the "dropping out process." Because of the necessity to identify the potential dropout before withdrawal, increasing attention has been placed upon identifying characteristics common to most dropouts. Most dropouts came from families of a low socio-economic class.

3. Activity 3. This research activity dealt with the interrelationship of home environment and employment for 40 workers within an Iowa community.

Results indicated such employment characteristics as seniority on the job, moving about or job mobility, and absenteeism all were related to home environment.

Within the home environment, the characteristics of the spouse, the nutritional level, the social patterns, the authority patterns, and the household management abilities displayed were also found to be related to employment patterns of the workers.

4. Activity 4. This research activity dealt with manpower requirements and demand in agriculture by regions and nationally,

with estimation of vocational training and educational needs and productivity.

This continuing activity deals with estimation of labor and manpower developments in agriculture and the related agri-business sector of the nation for as many as 144 regions of the country. The activity points toward changes in agriculture and vocational and technical requirements for this activity and for farm people over the next 15 years. Much of the analysis relates to estimation of the structure of the agricultural work force and its skill requirements at future points in time.

Results indicated that inter-sector economic and labor flows, and the dependencies of these sectors upon agriculture and labor could be, analyzed through an input-output model. Within this model agriculture was divided into regions and commodities to determine flows and inter-dependencies.

Results from this model showed major regional changes to be in store for agriculture and its manpower requirements over the next 10-15 years. While the greatest number of the 144 regions were shown to be intensifying their production, they were also shown to be specializing by putting more emphasis on technology.

5. Activity 5. This research activity examined problems of predicting change in technology, jobs, and vocational training needs in rural (non-metropolitan) labor markets.

To date results of aspects of this study for two functional economic areas are available.

Results of statistical analyses led to the following hypotheses being accepted: (1) there was no difference in dollar food sales between or among location centers within two functional economic areas examined, (2) after adjusting dollar food sales with number of services, there remained no difference in dollar food sales between the two areas or among the location centers within these areas, (3) there was no difference in dollar feed sales per employee between the two areas or among the location centers within these areas, (4) there was no difference in per cent of total business in food between the two areas or among the location centers within these areas, (5) there was no difference in per cent of total food sold within 10 miles driving distance between the two areas or among the location centers within these areas, (6) there was no difference in miles to the most distant customer between the two areas or among the location centers within these areas, and (7) there was no difference in food prices between the two areas or among the location centers within these areas.

6. Activity 6. This research dealt with the potential contribution of psychology to inter-disciplinary research in vocational-technical education.

Results from this work have shown that psychological research dealing with the aspiration level of high school students is fairly extensive. This work indicates that aspiration levels may be considered as important to success in vocational and technical education.

Studies dealing with the influence of the high school teacher upon student aspiration stress that the educator, as a model for student performance, has significance for appropriate goal settings. Psychology research also indicates that areas of student interest have implications for success in vocational and technical education.

7. Activity 7. This research activity dealt with determinants of the post-high school educational and occupational choices of Iowa farm boys.

Results to date include data collection and some analysis.

Data were collected in a series of state wide surveys covering a sample of 790 farm boys who graduated from Iowa non-metropolitan high schools. These data have been coded and put on IBM cards for analysis.

This activity is aimed at increasing the stock of knowledge of (1) the determinants of educational and occupational choices of farm boys, (2) factors that restrain post-high school investment in education, and (3) amounts of under-investment or over-investment in training for farm boys.

8. Activity 8. An analysis of legal and political problems and the strategy necessary for implementing programs under the Vocational Educational Act of 1963 was the subject matter of this research activity.

Research results include: (1) a study of the process of program evolution for area vocational schools in Iowa, (2) a bibliography of studies dealing with vocational and technical education by state and federal agencies, and (3) a study of congressional hearings held regarding the Vocational Education Act of 1963 and related measures.

C. Project Results

Aggregate project results from the Strategic Intelligence Unit and the Research Activities Unit under this contract indicated the multi-dimensional nature of the problem structure surrounding vocational and technical education and the need for creative and novel approaches in research and development, including inter-disciplinary research.

An inter-disciplinary attack upon problems of non-metropolitan area citizens is required for several important reasons shown in the results of this work.

First, people in the town-rural complex were found to be buffeted by a multitude of political, social and economic changes. These changes, largely created by forces beyond their control, affected these town and rural residents very significantly and subtly.

These affects were shown in changes relating to job opportunities, school tax burdens, and forced occupation and geographic migration. Decline in non-metropolitan area service business and in population age 18 to 40 sharpened the problem.

Results showed that with national economic growth and the resultant technological development calling for substitution of capital equipment for labor on the farm and in other basic industries, the farm labor force and the rural-town labor force has declined drastically in the last 25 years. Farming opportunities for rural youth dropped off tremendously giving rise to needs for non-agricultural vocational education.

National economic growth has resulted in large scale economic operations, but has forced great social and economic adjustments on non-metropolitan area citizens. Small towns and rural areas have now become over supplied with social institutions designed for less mobile, more agrarian, and more populous areas of the not too distant historical past.

Results have shown that questions are being raised about the need for consolidation of local governments, local churches, local businesses, local educational structures, and other local community services whether public, quasi-public, or private. This has been forced because of money and resource constraints. Consequently, non-metropolitan area social, political, and economic institutions are being forced to spread over greater and greater space and serve people at greater distances.

IV. DISCUSSION

Discussion of results will be divided by major project components.

A. Strategic Intelligence Unit

Early in the project work, Strategic Intelligence Unit members started taking a very broad view of research and development problems.

The current dissension, confusion, and disorganization existing in the collective mind of society regarding educational activity, demands the broad and general beginning.

Defining the functional aspect of education as change with choice gives a collective starting point from which to move and emphasizes interaction over time and within time among the individual's environment. This state of knowledge within the individual and states of knowledge in the collective minds at hand interact to give education or change with choice.

This general approach to problem setting for vocational and technical education concerned itself with present and past unrealized human, social, and economic goals, alternative ways to fulfillment, and how these were constrained within existing laws, programs, educational philosophies, and beliefs in the minds of leaders.

Research concerns could be built around constraints upon goals, goals themselves, and interaction between these two in the dynamic process of functional education. Also, research could be concerned with theories of past and present and hypotheses from these. Generating testable hypotheses regarding the process of education using existing research techniques could be a primary concern of educational research. Beyond this could be a concern, also, for the way in which results of these statistical tests altered or fail to alter educational practice.

The following research and development problem clusters were accepted by the Strategic Intelligence Unit: (1) human resources, (2) social institutions, and (3) societal organizations and goals.

This clustering resulted from examining problems which had social, political, economical, educational and technical characteristics.

Work of the Strategic Intelligence Unit resulted in suggestions for manageable research projects which would be concerned for definitions of parameters constraining vocational and technical education within the general social framework.

The Unit also established general areas in which research work for non-metropolitan areas might be directed. These were: (1) training opportunities in growth industries for those without proper skills so that these non-metropolitan area people could enter growth areas of the United States economy, and (2) training having highest payoffs to society.

Present problems include finding training systems with the highest payoff for those trained and for society, too. This payoff can be evaluated in terms of increased productivity, maintenance of income stability within the economy, escalation of income for the individual, social impacts of training on individuals and families mobility for higher income, social impacts upon a given community, or social results of a high degree of mobility.

Further research concerns could deal with social innovations for institutional change. Social institutions are lagging behind technological change. Questions about the present adequacy of educational systems for an industrialized society can be raised and are fundamental. What are the implications of a shorter work week for this educational system, particularly the vocational and technical aspects of the system? What is the social responsibility to improve the individual as a member of the social order? Does an occupational schooling need to have its status changed so that it is considered to be equal to a college preparatory program within a high school? Is there need for a larger degree of in-service training? Are needs present for schools which are intermittent and available for short periods of time for itinerant workers, their off-spring, and older adults beyond the usual high school age? Is it possible to use laymen or non-professionals as teachers? Does a governmental structure or a business organization have a responsibility to teach migrants? Have needs arisen for special schools for migrants and non-assimilated nationals? Is there a need for organizational structures within vocational and technical education to aid in horizontal mobility across jobs as well as vertical mobility within jobs?

Beyond the questions above, questions for research might be raised to deal with vocational-technical educational structure and its characteristic decision-making framework.

Unit members discussed material received by the Research Coordinating Unit directed by Dr. Trevor Howe. Publications prepared, and in the process of being prepared, on work areas covered by vocational and technical education were examined.

In developing research needs in vocational and technical education, the Unit believed one might distinguish within the human resources category the needs of youth specifically, and then the needs of society specifically. How youth is prepared for societal life and work in today's industrial society and today's labor markets is highly significant if society is to sustain the ability to increase productivity and fight inflation as well as unemployment. To sustain adaptability of the changing economy within this society is of great importance.

Societal needs and individual needs may differ. Therefore, separate examination and joint examination is needed. The process of formulating and acquiring a suitable training system for youth needs examining. Goals and objectives arising from policy-makers, concepts and from philosophies may not be specifically adapted to the reality of today's industrialized economy.

The training needs of youth as suggested by W. G. Stucky include: (1) training which is career-oriented and gains youth initial access to the job market and equips him for initial responsibilities in society; (2) programs designed specifically to enable youth to earn while learning or learn while earning; (3) inservice-training to assist youth who have become part of the new labor force and to assist older workers who desire more complex skills, or more responsibility in their "Nth career" preparation; (4) information which enlarges youth's perception of the economy, the societal order of the nation, the future job market, and the alternative income-increasing choices available to him; (5) ungraded intermittent training schools for youth who are migrant workers and children of migrant workers, and (6) special schools for immigrants (youth and adults) and for citizens who have had only intermittent success in school.

The training needs of society as outlined by W. G. Stucky include: (1) information on which an adequate understanding can be built of the broad range of educational needs of a highly industrialized society which makes massive public and private investments in science in order to produce new technology; (2) an educational philosophy which fosters development of a system of (in-service) training by "Nth career schools" operating as a perquisite to working by those employed in sub-professional occupations especially; (3) information to improve understanding of

the changing job structure, rates of employment and windfall in income gains and losses from changes in technology; and (4) information which would enlarge understanding of the need for mechanisms to continuously appraise the nature of problems concerning the formation of human capital and which would aid in formulation of alternative innovations in institutions.

Pertinent to developing more research areas would be an overview or survey of the history and philosophy of education in the nation, particularily the role of vocational and technical education in a democratic society. Administrative policies for vocational and technical education would also be an aspect of this study. Pointing up agreements, disagreements, and alternatives which have been developed for vocational and technical education would be significant.

Developmental research could take the following pattern. A number of individuals could each write a report, not a detailed research activity. This report could include feelings and conclusions regarding vocational and technical education. These could give a focus on problems, not techniques. The Unit could use these to discuss kinds of educational systems needed.

Mr. Clarence Bundy led the Strategic Intelligence Unit through an examination of the history of vocational agriculture, its recent research problems, current legislation, and its possibilities for training for farming and for non-farming activity.

In a recent study (7) 63% of graduates were found to go into farming after graduation.

From the discussion with Mr. Bundy, three pertinent problem areas appeared to exist for post-high school programs: (1) academic credit for vocational agricultural courses, (2) timing for entry into vocational and technical agricultural courses, and (3) the point of entry.

For vocational and technical education, training of teachers presents problem areas because: (1) vocational agriculture is more than just a preparation for farming (recent studies (6,7) show 200 new employees will be needed each year in the farm implement business and in feed and fertilizer businesses 2000-3000 people will be needed in two to three years), (2) sixty per cent of students who enroll in agriculture courses at Iowa State University have had vocational agriculture, and (3) because the outlook of farming is much better than it was, there could be increased demands on vocational agricultural programs and its staff.

Major issues and concerns for vocational and technical educational training were indicated by President Kennedy's panel on vocational and technical education (7). Services of vocational education were believed to be too rigid. Too much concern was shown for jurisdiction over providing given activities. Suggestions for change were made. To overcome rigid institutionalism in favor of functionalism, use of advisory committees on employers' needs might be developed. Willingness to give to private industry funds for research operations in vocational and technical education was mentioned.

It appears possible from Strategic Intelligence Unit work to imagine a framework in which educators are in communication and constant touch with the activators in vocations and technical services even under conditions of dynamic economic change as it now exists. Continuing education of teachers and of citizens could be a logical outcome of this particular pattern.

Quite probably vocational and technical education can be devised for what has been considered low levels of abilities. Questions of below average capability and retardation need more exploration. Some myths have been exploded.

Concern for all regardless of their IQ scores needs to be more in evidence. Training for good citizenship is important. There are at least these steps in retraining: (1) high school level skills, (2) incentives to rise in the vocation, and (3) generalized training for social living and adaptation to a changing world.

A core of knowledge may be found essential to many jobs. In examining these questions, labor force attitudes could be examined for conflicting pressures, and for special interests.

On a national basis, no boundaries and no limits have been set on the demands made upon vocational and technical education. Limits and priorities must be recognized. Research and development should help by providing materials, ideas on philosophy fitting to vocational training for educational purposes, and ideas on how to organize.

Schools should think of identifying students earlier than at the junior or senior year for future vocational and technical training. Students as well as schools and teachers should be prepared to locate sources of reliable information on future manpower needs.

Certain research has shown youth in urban areas to have very low occupational realism.

Many youngsters in agriculture are going to migrate to get jobs. These people haven't been around industry so they have not formed models. This means they don't have a realistic conception of the occupational world.

Research work indicates critical stages at which job decisions are made. It also indicates young people engage in fantasy.

Junior high school is a critical point for job decisions because individuals must decide on which curriculum to follow: college, general, or non-college.

Problems and questions arise about differences between basic and applied research, and how money and time should be allocated between each. The quality and quantity of research in vocational-technical education depends on this allocational choice. In general, both types of research seem to be needed: (1) basic research for new theories and insights and (2) exploratory studies to determine what the on going situation actually is surrounding vocational and technical education.

The term "vocational" is an extremely broad word and people use it in various ways. It has become extremely vague in its uses today and has caused some disagreements which are rather unnecessary.

Young people 18, 19 and 20 years of age are economic creatures for the most part. They are motivated to a greater degree if they can see where they are going and how they benefit directly from their education. The best motivation to a student is a clear objective.

Automation is creating more and better jobs all the time, but these take people who can understand the methods. It's up to educational institutions to do the preparing properly. When courses are tied to immediate values and these values are possibly phased out in the near future, an argument arises for putting more emphasis on theory and basic understanding.

Serious research is needed to help high school counseling. By using statistical methods in research,one can tell much more about popular wants, needs, interests, and abilities. At the present time, test results allow us to be <u>certain</u> of very little about any one specific individual. This is because there are far too many variables to handle readily. Ignorance exists regarding interaction between these many variables.

A number of qualities need examining. These include: (1) mental dexterity, (2) interests and aptitudes, (3)available energy, (4) physical dexterity, (5) perceptual acuity, and (6) emotional stability.

Possibly too much faith is placed in current test results. These results may explore too narrow a concept of human character and quality. Current tests may examine mental efficiency without looking into the means by which the human system communicates and how it manages the tools that it has to express ideas and to perform creative activities.

Judicious use is needed of the present theories, analytic tools, and scientific methods of testing hypotheses regarding human resources. Training capabilities and needs, organizational structure, present systems of development, and how the human resources react to these aspects of vocational and technical training can be objectively examined.

Inter-disciplinary creativity can be used for new conceptualizations of old problems and for novel approaches to these.

B. Research Activities Unit

The eight research activities or projects undertaken within this contract dealt with several aspects of problems of vocational and technical education and were divided as follows: (1) decision-making processes regarding capital investments, (2) drop-out problems of high school youth, (3) interrelationships between home and work, (4) labor requirements within agriculture and agri-related industries, (5) relationships between technological change and labor markets, (6) psychological research capabilities to deal with vocational and technical education, (7) determinants of post-high school educational and occupational choices, and (8) examination of vocational and technical training structures, law, and implementation.

These eight dealt with socio-economic forces affecting vocational and technical training as constrained by statute and by subtle political forces. The research possessed functional and institutional aspects, fitting the following logical pattern: (1) discussion of attitudes, markets, and training of the human resource needing help, (2) discussion of techniques for establishing a legal framework within which community capital investment decisions can be made by popular will under structured leadership, (3) discussion of existing structured training processes and drop-outs, and (4) discussion of processes to alter the human resource to be trained, the training process and the final results.

Research on the capital investment decision-making process was exploratory, attempting to establish and to quantify dimensions of the problem and to provide a basis for more rigorous conceptualization later.

Analysis of the data collected in this activity indicated no discernible pattern to be followed which would assure success in passing a school bond election for vocational-technical educational facilities. Few significant differences among the multitude of variables were found when successful districts were compared with unsuccessful districts.

The largest differences were among correlations between communications media usage and election outcomes. Most communications media were negatively related to bond election success. A community tradition of passing or failing a bond election appeared for many districts.

Simple research frameworks and methodology normally employed in survey research techniques did not provide the hoped for insights into the dynamic process of school bond election decision-making.

In considering the Iowa school dropout problem, the following discussion is helpful.

In general the dropouts interviewed were cooperative. Interviewers were careful to stress the importance of the study without identifying it as a dropout study. Women especially were quite helpful. Male dropouts tended to be a bit skeptical about giving up a half hour of time.

Difficulty was encountered in locating some dropouts. In locating dropouts, it was discovered that many had parents who were tenant farmers.

Of 140 dropouts, twelve had moved out of state, thirteen had moved and left no forwarding address, two had been evicted from their dwellings, and one was in the state penal institution in Fort Madison, Iowa.

Two dropouts were not called upon because of warnings by the State Board of Health and by the police and postal authorities. Only two would not cooperate.

Thirty-nine males and 63 females were interviewed for a total of 102 of the original 140. A greater number of completed schedules for females than males was due mostly to unavailability of the males during the working day. Nearly all of the completed schedules for the male dropouts resulted from evening calls.

The fact that many of the dropouts were of a lower than average socio-economic class became apparent as interviewing progressed. Most of the dropouts came from large families. Many had parents who had not graduated from high school and had brothers and sisters who also had dropped out. Most of the parents were farmers or laborers; few had parents in the professions, management, or sales.

For the dropouts themselves only two were employed in management or sales, the rest being farmers or laborers. A number of the dropouts were untidy in their personal appearance.

Perhaps one of the most remembered facets of interviewing was the appearance of their housing. Scarcely any of the dropouts lived in what could be classified as the nicer areas of town. In fact, interviewers could frequently identify the dropouts' dwellings by unkept front lawns, porches in need of repair, or housing with an old, shabby appearance.

Generally, the problem of dropouts seemed to continue after leaving school.

In the study which dealt with interrelationships between home environment and employment, problems of grouping workers by home environment and other characteristics arose. These problems included worker and spouse age differences, differences in socio-economic strata, driving distance differences, educational differences, and differences in amount of work done on other jobs such as farming.

Although the number of children in families was similar, the proportion of children in different age groups varied.

These problems were resolved as best they could be, giving significant and interesting differences to be noted.

Among these differences were wages, mobility patterns, spouse's role and absenteeism. These seemed related to home environment.

Positive and significant relationships were found between seniority on the job (a stability or non-mobility index) home environment; also, between absenteeism and the number of children in the family.

Research on manpower requirements and demand in agricultural regions and attendant training needs shows that specification

of the optimum amounts, forms and facilities of vocational education and technical training can be done only if we know or can project certain information. This includes the number of farms, the degree of specialization in the industry and the extent to which farming is organized around large-scale units with one manager and several skilled laborers, the capital/labor ratio of the industry and the number of workers in each labor category, the scientific and management orientation of the industry, and related phenomena. A basic analysis of training needs for the future, with respect to labor and its skills and types of regions, products and tasks in farming, requires prediction and projection of the structure of agriculture itself.

A prediction of the structure is required because it is expressed in various types of the capital items that farming uses. On the one hand, these capital items substitute for labor, thus helping to determine how many laborers there will be. Also, the capital items determine the size and number of farms that will exist. This information is needed to determine how many farms there will be, and how specialized and how large they will become in terms of managerial resources and work force. For example, we are projecting the number of two and three-man farms for the future. This will help to determine (a) the proportion of the farm work force for whom the main educational and vocational training needs are to emphasize managerial abilities, (b) the proportion who will operate the machines, equipment and enterprises and thus need skills training rather than managerial training, and (c) the proportion who will serve purely as laborers and need a different background.

In investigating technology as it related to labor markets, recursive linear programming was used. Each functional economic area was divided into eight hypothetical types of townships, each type having a different minimum cost objective function.

Four different types of food retailers were defined.

Problems arose as follows: (1) different levels of technology could not be clearly identified because most firms were using more than one level of technology for the different activities performed; (2) cost identification problems appeared because a lack of uniform bookkeeping prevented obtaining really comparable cost data.

A more direct approach was taken. A survey of 66 food retailers in three location centers within the two functional economic areas was made. The numerical data obtained was tested in seven different categories: (1) 1965 dollar good sales,

(2) sales per employee, (3) per cent of total business in food, (4) per cent of total business within a 10 mile driving distance, (5) miles to most distant customer, (6) number of food services offered, and (7) food prices.

The relationships between these seven variables and the different levels of technology used in retailing were not found to be of any great significance.

The report dealing with psychological studies relative to vocational-technical education showed that recent advances in psychology have produced concepts and information of considerable value to vocational and technical education.

These current developments can be explored for full educational implications and directly related to the needs of vocational and technical education. If gaps in developments are found, new research could be conducted to fill these.

Research on determinants affecting job decisions of farm youth has found technological and economic forces to be reducing opportunities for farm boys to enter farming and earn incomes comparable to those offered by non-farm occupations. As a result, many youth have been leaving the farm. Large numbers will continue to seek employment in farm related and urban oriented industries in the future. If farm boys are to compete on equal terms in the competition for non-farm jobs, many will have to prepare themselves better for the future jobs than for the past ones. For this to happen there must be adequate opportunities for post-high school training, and farm boys must take advantage of these opportunities.

Knowledge of the job choice process and determinants associated with it are important. Post-high school educational and occupational choices of farm boys need examining, and obstacles to achievement need examining. Possibly the need is for further investment in training and education.

In the research dealing with analysis of legal and political problems and the strategy necessary for implementing programs under the Vocational Education Act of 1963, no definite statements or conclusions can yet be made regarding criteria to use when selecting geographic areas for intensive study of strategy and problems. Preliminary analysis did, however indicate seven factors to be employed in this selection process: (1) regionalism, (2) state effort, (3) participation, (4) program emphasis, (5) administrative structure, (6) centralism versus localism, and (7) program quality.

State vocational programs tend to vary by region. Southern states have programs which generally differ in significant ways with those of states in other regions of the United States.

States tend to vary in the amount of financial support given to vocational education. Per capita expenditures by states for such training is one measure of effort.

Although related to state support, the proportion of individuals eligible for vocational programs and who are actually enrolled in such programs varies from state to state. This may be a factor of significant importance. The continuance of state vocational agencies and programs may be affected by the participation ratio.

State programs vary in emphasis placed upon alternate types of training. Some states emphasize agricultural and home economics training. Others strongly encourage trade and industrial training.

It would appear that general differences exist among groups of states in structures used to administer vocational education. For example, institutions of higher learning have the primary responsibility for program administration in some states. Elsewhere state boards of education have major responsibilities.

In some states, educational policy and decision-making powers are centralized in a state agency having full administrative responsibility. In other states, the state administrative agency merely sets down general policy guidelines. This, in effect, allows local educational agencies nearly complete autonomy in making program decisions within the local community.

Finally, program quality varies among states. Although unable to define specific factors to be employed in determining variations in program quality, some states are said to have high quality vocational education programs while others seem to have programs which are not of high quality.

C. Project Discussion

Compared to the other areas, non-metropolitan area communities are at a great disadvantage in availability of opportunities for general education, vocational education, local employment, on-the-job training, and similar amenities. Facilities for vocational training of the female labor force are entirely inadequate. Thus, in general, women must migrate to find jobs. They face a limited selection of vocational education opportunities relative

to the occupations which exist, and relative to current and prospective demand for their services.

But vocational training for boys from farms and towns in rural communities is equally limited. It places them in a disadvantaged competitive position in the economy. In entire states such as Iowa, Kansas, Georgia, Mississippi, Nebraska, and North Dakota no more than 32 per cent of vocational education funds are allocated to trades and industries (7). The remainder was devoted to vocational agriculture and home economics (7).

Not only are farm boys who must leave agriculture penalized in economic opportunity by these allocations, but also youths in villages and towns who are excluded from opportunities for training and employment freely available in metropolitan areas.

In addition, rural communities generally lack the breadth and quality of education available in urban areas. The range of offerings in adult education programs and short courses is narrow; the opportunities for employment in various plants and establishments which lead to an upgrading and accumulation of skills are extremely limited.

The thinning of the population and the relative decline in buildings and taxable property generally are reducing the tax base for supporting local education including vocational education. In addition, the selective migration taking place causes the "left behind" population to be older and to have a lessened interest in those educational investments which pay off over the long run and in other geographic locations.

In 1965, approximately 55 per cent of 459 Iowa high schools offered vocational agriculture and 45 per cent offered home economics, while only 7 per cent offered distributive education and 7 per cent offered trade and industrial programs (7).

According to the 1960 United States Census, only about 25 per cent of the working force in Iowa were employed in farming whereas, about 12 per cent were employed in clerical and sales positions, 16 per cent in crafts and industrial positions and 16 per cent as operatives. While many Iowa youth entering the latter occupations may need competencies in agriculture or home economics, a large majority do not presently have opportunity for vocational education that meet their needs.

According to unpublished data gathered by the State of Iowa Department of Public Instruction nearly 16,000 Iowa girls were

enrolled in homemaking and 10,500 boys in agriculture in 1965. By contrast, only 1,490 pupils were enrolled in distributive and office education programs, and only 1,675 high school pupils were enrolled in schools with enrollments of 300 or more pupils. High schools with enrollments of less than 300 pupils offer little vocational education other than agriculture and homemaking, and these offerings do not meet the needs of most youths who will migrate to jobs in metropolitan areas.

These data further indicated that of the 33,044 Iowa high school seniors who were graduated in the spring of 1964, 33 per cent were enrolled in four-year colleges the following fall, 10 per cent in junior colleges, 10 per cent in business, trade and technical schools, and 3.5 per cent in apprentice training programs. The other 43 per cent of the 1964 graduates were not continuing their instruction following high school. Undoubtedly, many of the graduates who started in college will not continue and graduate. The apparent need for a strengthened program of vocational education at the high school and post-high school level is evidenced. Similar data may be presented for other states.

Also, of 6,000 farm boys who were graduated from high school during the 1950-54 period only 35 per cent were still farming in 1963 and 15 per cent were in occupations related to agriculture (6). These data emphasize the fact that vocational agriculture in high school provides vocational training for only about 50 per cent of the graduates. It is possible that many of the graduates who were enrolled in vocational agriculture would have enrolled in other types of programs had they been available.

V. CONCLUSIONS AND IMPLICATIONS

Conclusions and implications relevant to this portion of the final report will be given for each major component of the project.

A. Strategic Intelligence Unit

Numerous conclusions and implications for vocational and technical education can be drawn from the work of the Strategic Intelligence Unit.

In examining discussions held by the Unit on the problems of vocational and technical education, the role of such training in the total educational systems was found to be confused and unclear.

This confusion implied a need for a working, functioning rationale for vocational and technical education. This working rationale could be drawn from a philosophy for education in a democratic society. This statement could be based on why the U.S. educates, on the present adequacy of existing education, on how the education is structured and changed, how its worth is to be measured, and how it adapts programs to new developments. Within this framework, a working rationale for research and development could arise. This would identify divergencies of thought out of which could come conferences on new ideas. Then theories specifically dealing with vocational education and its legal setting for a state and nation might be developed. Discussion and analysis could follow of administrative definitions of laws and their implementation within the legal, socio-economic, and political framework affecting workers and training for the world of work.

Purpose, function, clientele, organizational structure, administrative authority, and teacher training are all to fit within the general rationale.

Training problems are still confronting the unemployable, particularly those in depressed areas like the agricultural deep south, the upper peninsula of Michigan, and Appalachia, where lack of training, wrong location, wrong work habits, and poor attitudes are primary problems. Programs run into trouble with managerial personnel who cannot supply the needed vision. Programs for urban areas are only part of the solution to problems of unemployment, unfilled available jobs, and inflation of wage rates. Nation-wide human renewal must be the goal with use of imagination, brains, money, and organizing talent. Programs for human resource development can be emphasized to get a person off government welfare roles and into government tax-paying columns as a return on any investment in human resources at any governmental level.

Studies of United States economic problems today are spreading and broadening their dimensions. Attributes of socio-psychological problems of the unemployed are being included. Trained research personnel can help human resource development programs in five specific ways: (1) provide technical assistance to action agencies concerned with human resources development; (2) institute programs of information on research developments and evaluations of existing programs; (3) provide training orientation programs; (4) provide human resources training in curricula for students who expect to be working in human resource development fields; and (5) provide research programs dealing with resource

development policy.

An inter-connection exists between job training programs and a balanced economy. This inter-connection must be recognized to forestall the likelihood of another serious imbalance. The balanced growth of an economy gives economic security and national well-being by providing customers who have a steady demand for goods and services, and by providing people with a psychological sense of achievement.

Trained research personnel can further aid vocational and technical education by examination of processes for decision-making on educational policy. Further, deciding what part of the educational system ought to be left to industry is another concern.

Psychologists can help in concern for problems surrounding skill development. Some psycho-motor skills are basic to many occupations. Not much research on common characteristics has been done. These common features include attitudes, habits, degress of maturity and value systems.

Clusters of possessed skills as well as psychological, sociological and economic factors influence people's opportunity and willingness to pursue education necessary for personal and economic development. The United States' economic and educational systems have not developed a capacity to utilize innovation.

Certain concerns among problems of vocational and technical education can be analyzed from the standpoint of political science. The Strategic Intelligence Unit, in interaction with one of its members, Professor Donald Boles, explored government implications involved in development of Iowa's area vocational schools. For political scientists a critical area to examine are the fundamentals of vocational education in any state. These are crucial governmental and political considerations involving the development of an educational program and its implementation. Iowa's vocational schools create new governmental structures and new problems will emerge from this new structure.

These new Iowa schools might help meet demands which the Strategic Intelligence Unit membership and consultants have found to exist.

A labor demand in Iowa industries exists for machinists, draftsmen, engineer draftsmen, machine tool design welders, technical engineers, management and research people, chemists, printers, mechanical engineers, sales personnel, welders and supervisory people.

Smaller companies would like to train people in their own factories but cannot afford to do so. Therefore, they would like to cooperate with schools on this problem. Certain problems do arise. Some of these are related to union rules regulating apprenticeships.

The Strategic Intelligence Unit membership found problems arose because of confusion about the placement of vocational education. What educational level should have primary responsibility for a given training? As a result of not answering this question, vocational education may be repeated.

Two points need to be kept in mind: (1) possibly the need is for a basic change in the philosophy of vocational education, and (2) possibly the need is for clear preparation for work entry or for added programs which lead to it.

Women are a forgotten group in vocational education. There has to be some way of placing them and creating a demand for them in an area. There could be specialized home services, skilled tailoring and custom dress-making. The fundamental question is, should vocational education take responsibility in stimulating these opportunities.

The confusions and lags noted in program development may in part be due to the value systems of non-metropolitan communities. The psychological, sociological, and economic barriers to seeking education may be far more formidable for members of these areas. For example the dropout rate of students in rural areas is about 50 per cent greater than that of urban areas(7,8). Further, rural community youth drop out with less schooling than do urban youth. More than half of the rural area dropouts leave school before reaching high school age, while only one-third of the urban dropouts leave school that early. Nationally, the educational achievement of rural youth is less than that of urban youth; rural youth scored 15 per cent lower on reading, spelling, arithmetic, and social studies and 25 per cent lower on science and grammar than urban youth. Also a smaller percentage of youth from rural communities attend college.

Obviously, investing in more and different kinds of education alone will not solve all deep-seated problems of vocational education, manpower development, and economic opportunity in non-metropolitan communities. However, without planned programs to enable these youth and adults to participate more in existing and improved education, their handicaps will continue and multiply. Illustartive of this tendency are differentials in earnings related to education.

Compared to urban parents, a high proportion of rural community parents have comparatively little education. Many rural community parents are in low-status occupations. Sometimes these communities tend to be indifferent to the problem of educational opportunities for youth. Such problems can be overcome only with careful planning and pilot projects to test the worth of educational innovations.

Since many problems pertinent to vocational and technical education arise from rapidly changing demands for workers, and since this demand is in large part affected by technological change within the economy, the Strategic Intelligence Unit in conference with Dr. Evelyn Murphy as consultant established a conceptual framework for examining problems of forecasting industrial technology in the United States as shown in Figure 2. Concern would be shown for the effect of technology upon manpower development with special interest in research related to forecasting national manpower changes and the impacts of these shifts. Research is needed in forecasting technological innovations. How these stimulate economic progress is a big problem, but not the only problem. Concern also exists for social and political consequences of technological change. The possibility of relating all these changes can be explored.

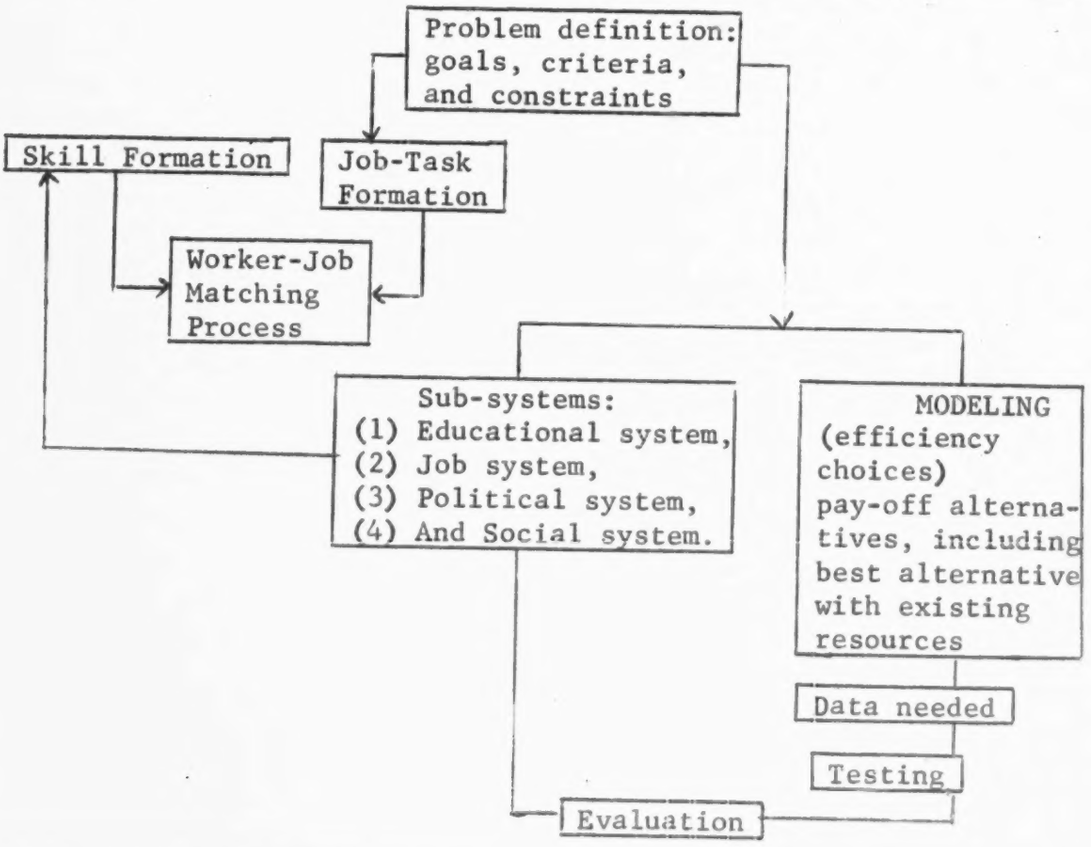
Use of forecasting information by school counselors is another concern. Different students need different information and different time perspectives on their information. Occupational choice is a process of making and re-making decisions. Knowing of possible technical changes before they come is highly desired in guidance of the labor force.

B. Research Activities Unit

Conclusions and implications to be drawn from the eight research activities can be discussed collectively.

In research dealing specifically with decision-making on vocational-technical education bond issues, an analysis of data

Figure 2. Problems of Forecasting Technological Change



collected in the study indicated no discernable pattern to be followed to assure success in passing a school bond election. The purpose for which the election was held did not appear to be associated with the outcome of the election. There was a lack of consistency or pattern in the techniques employed in the campaign strategies promoting these school bond elections. As a result, many of the correlations obtained in this study were not related to the percentage affirmative vote, hence not to the outcome. In addition, many correlations were not in the expected direction. In view of the review of the literature for this project, it was not anticipated that most communications variables (as measured in this study) would be negatively related to election success or conversely that the traditional techniques of election communication strategy would correlate highly with the unsuccessful districts.

The size of the issue, per cent eligible voting in the election and traditionally asserted causes of election defeats were not to be found operative in these Iowa school bond elections.

These unanticipated findings led to the consideration of an alternative hypothesis, that different strategies may be used when the outcome is expected to be close. Data related to the latter point were examined.

When a general lack of association between the outcome of the election and the variables used in this study was found, the hypothesis that "closely contested" issues would differ from the remaining elections was advanced. Closely contested issues were defined as those receiving from 50.0 per cent to 69.9 per cent favorable vote. Districts that received large majorities and those that received less than one-half of the vote were defined as outside the closely contested issues. This resulted in 89 of the 195 districts being classified as "closely contested." The rationale was that if the outcome was predicted to be very much in doubt, different strategies might be used to attempt to secure a favorable vote on the bond issue.

Clearly, this was not apparent in the elections classified as contested. The correlations were quite similar to those for all bond issues. There were no significant differences in the demographic, economic, election history or communications variables. This finding was not consistent with the rationale for examining issues in this vote range. It was assumed that different relationships would be found. They were not.

There were limitations in this study. These data represent the recalled knowledge and attitudes of the superintendents for the most part. As such, they are subject to the usual "decay factor" over an extended time dimension. Some of the elections had been held 5 years prior to the survey. In addition some of the data are second order cognitions, and are subject to the usual criticism of attributed knowledge and attitudes as perceived by a second person. In most cases, the data are quantitative, not qualitative, e.g. data on using or not using lay committees, not on composition, quality and procedures used by the lay committee. Even with these shortcomings, the researchers are not aware of an equally exhaustive study of data collected at the election source. Many dimensions of the problem has been established and much has been learned to apply to future studies of school bond elections which are currently underway.

In studying certain Iowa public school dropouts, it was seen that most of the dropouts came from large families and frequently had brothers and sisters who also had dropped out.

Many had parents who had not finished high school. Approximately 30% of the dropouts' fathers were farmers, occupations for the rest being nearly evenly distributed among the major census classifications of managers, craftsmen, operative, and laborers.

Each dropout interviewed was asked to rate high school course areas he had taken. The males rated industrial arts and driver's education highest in both importance and interest. English was rated lower in interest than any other course taken by the male dropouts. Sociology and psychology, home economics, and driver's education rated highest for the females in both interest and importance. The traditional core courses of English, mathematics, history, and science were rated least interesting and most difficult by both the males and females.

Several additional factors contributing to dropping out were examined. They included lack of extra-curricular interests, owning a car, missing school for employment or work at home, low academic standing, influence of parents and friends, reported lack of interest and individual help given by teachers, dislike of teachers or school officials, unpleasant experiences with teachers or other students, an unhappy home life, and a record of previous dismissals or withdrawals from school.

The most common reason for dropping out was loss of interest or dislike of school and courses for the males and marriage or pregnancy for the females.

Thirty-eight of the male dropouts and twenty-three of the females reacted favorably about having an advisor from outside the school system. A number commented such a program might have kept them in school.

Some of the dropouts' suggestions for school improvement included curriculum expansion to include various types of vocational-technical education, special teachers, and classes for slow learners, more individual help, and better counseling.

Results indicated that only in a few cases was the decision to leave school a spontaneous one for the dropout. For this reason, dropping out has been sometimes referred to as the "dropping out process." Because of the necessity to identify the potential dropout before withdrawal, increasing attention has been placed upon identifying characteristics common to most dropouts. Most dropouts came from families of

a low socio-economic class. The dropouts themselves often showed a marked disinterest in school and related activities.

Based on these findings, the following recommendations might be made: (1) expanded curriculum offering to include additional vocational or technical courses; (2) to utilize information on characteristics of potential dropouts for early identification and corrective action; (3) special assistance to pupils having difficulty especially in core curriculum courses; (4) to provide expanded guidance services; (5) utilizing high school co-operative programs when vocational courses cannot be offered; (6) to provide an opportunity for the development of interest and motivation; (7) to make adult or correspondence courses leading to a high school certificate available especially to girls who had dropped out of school because of marriage; and (8) follow-up and assistance to dropouts in securing employment or additional training.

A number of characteristics of the home environment of skilled, semi-skilled and unskilled workers appear related to the employment record of the husband. Based on the inter-correlations among variables, clusters of characteristics of home environment and employment were tentatively identified. Further studies should include the formation of clusters of related variables after data are obtained from a sample larger than the one on the present study.

Characteristics of the home environment that appeared positively related to the interrelated employment variables, criterion group or wage group at time of the study, mobility, wages, and seniority, were psychological characteristics of the wife, number of suggestions for house improvement, type of clothing worn by the man to work, preference of the wife for a fourteen dollar dress over two seven dollar dresses and knowledge of food and nutrition on the part of the wife. Knowledge of textiles and clothing by the wife was positively related to seniority; attitude of the wife toward the job of the husband, to wage group; extent to which the husband selected his own clothing, to wage group and seniority; and management of resources, to wages.

Three of the home-environment variables correlated positively with suggestions to the company. These included management of resources, psychological characteristics of the wife and number of suggestions for house improvement.

Number of children in the family and geographic mobility of the family correlated positively, and regularity of saving by the family correlated negatively with absenteeism. Absences due to illness correlated negatively with the housing cluster and management of resources and positively with extent to which the family was patriarchal in authority pattern.

It is recommended that the relationships identified in this study be investigated further in a survey of employees in industrial, distributive and service jobs for which vocational and technical education provide training. A number of the measures of the variables need refining to provide for increased reliability.

The method of defining a population and sampling employees of a co-operating company was efficient in terms of locating employees and their homes, obtaining reliable and valid data regarding employment, and gaining the cooperation of the interviewees. It is recommended that a similar procedure be used in studying employees of a number of firms.

The following null hypotheses are also proposed for testing. There is no relationship between a cluster of employment variables including wage group, mobility, wages and seniority and the following differentiating variables for family units: psychological characteristics of the wife, aspirations of the family relating to housing and clothing, type of clothing worn by the employee, knowledge of aspects of homemaking, attitude of the wife toward the job of the husband, quality of housing, quality of clothing, social participation index of the family, management of resources and dietary intakes of the husband and wife. There is no relationship between suggestions to the company and educational level of the husband and wife, management of resources and psychological characteristics of the wife. There is no relationship between absenteeism and number of children, quality of housing, geographic mobility and roles assumed by family members.

Translation of labor demand and manpower requirements into amounts and kinds of vocational education and technical training will be completed after final synthesis is made of several sets of quantitative data. Similarly, specification of organization and policy for this education in the rural community, directed towards both the farm and agri-business sectors, will be completed after synthesis of quantitative results has been achieved. However, several alternatives to the present structure of vocational and technical training have been examined.

Quantitative results to date pose several hypotheses for the future structuring of vocational educational training for agriculture. The results of one model, the programming results explaining the inter-regional shifts and specialization of agriculture, can be used as an example. This model indicates some major shifts among regions, some shifting from crops to more extensive production with still fewer farms and a smaller labor force. Other regions would concentrate on a more intensive, but highly scientific and specialized agriculture.

In a preliminary analysis, used as a guide and model to be followed in determining the amount and quantity of labor and hence, training required in those regions shifting their agriculture to a less intensive basis, it was found that vocational training units to provide the range and depth of skills required, would entail fewer vocational training departments devoted solely to farming. However, these shifts in farming and training structure also would require, in each of these units or departments, more than one specialist so that the expected and necessary subject matter can be covered. In addition, a smaller number of high schools covering a wider territory could be used for an advanced third year directed towards the managerial-oriented segment of the farm labor force.

In contrast to these regions expected to shift from more intensive to extensive farming, other regions are projected to maintain the same product mix, but to increase the volume. However, the skill requirements in farming are stepped up to require more scientific knowledge, and attempt is being made to synthesize the knowledge requirements for managerial, vocational and technical training. Finally, a new model of training, related to the concept of the input-output matrix or resource flows, is being developed to provide estimates for the knowledge and skill requirements for the regional or local agribusiness sectors to serve agriculture.

In examining non-metropolitan labor market changes under changes in technology, few conventional beliefs were supportable.

Further studies should be made of the labor markets examined in this study. A selected industry might be one that has obvious economies of scale, markets a single product, or markets a product for which price is relatively important.

Work under the project which dealt with possibilities for inter-disciplinary research involving psychology and vocational-

technical education began because of encouragement by the Strategic Intelligence Unit. Because the study would have a short period of operation under this contract, the purpose of the study was to survey relevant literature on psychological contributions to vocational and technical education. The activity undertaken to date has dealt with psychological variables affecting levels of aspiration and levels of student interest as these affect educational achievement.

Work on the determinants of post-high school educational and occupational choices of Iowa farm boys has begun by drawing a sample of 790 farm boys graduated from Iowa non-metropolitan high schools. This work plans to seek (1) determinants of educational and occupational choices, (2) factors which restrain post-high school educational investment, and (3) amounts of investment in advanced training among farm boys.

The crux of the work on legal and political problems and strategy necessary for implementing programs under the Vocational Education Act of 1963 is involved with seeking to know, understand and analyze the elements inhibiting and encouraging development of vocational education locally and on the state level. This concerns programs pertinent to socio-economic needs based on regional demands as well as to national employment goals. Primarily, the work considers the rural or non-metropolitan populations as its focus of immediate attention. Therefore, four states whose population can be so categorized will be selected for legislative and administrative analysis of existing vocational education programs. Constructive policy evaluation may be evident from this comparative research of regional development. A thorough study of the Vocational Education Act of 1963 and of Congressional hearings is underway, with special attention given to statistical data found in the hearings.

C. Project Conclusions and Implications

This project for research and development in vocational and technical education for non-metropolitan areas in the United States dealt with the problem framework by means of group examination and individual research.

Educational problems examined included those which affected educational definitions, educational inputs, models of analysis and conceptualization, training and development programs, and policies.

In considering inter-temporal problems for human resource development overall models need to recognize development of

social institutions, possible goals and objectives, variety in societal forms, and ranges in social orders which could give objectives ranging from absolutism to nihilism.

However, for the project's problems one may presume people seek to approach democracy with its implications of equality for all individuals. This appears at least as the stated objective of the present United States social order. The degree of willingness to pursue this objective or ideal varies tremendously across areas and socio-economic groups. Further, even if there is behavioral agreement upon the social objective, the time path to follow and the interval of time to allow before fulfillment of the goal varies tremendously.

Problem examination can lead to research and development to provide information for adequate perception of the present situation and of prospective changes over time in the general social order.

Different influences upon the institutional structure could be recognized in the problem situation and the impact upon vocational and technical education could be discussed.

VI. SUMMARY

In this summary a brief description of problems and focus of this project will be discussed. The main project components were the Strategic Intelligence Unit and the Research Activities Unit, so the summary deals with these major divisions.

A. Strategic Intelligence Unit

In summary, the Strategic Intelligence Unit was designed to explore the broad dimensions of problems of vocational and technical education in non-metropolitan areas. In pursuit of this objective the Unit saw certain research areas which might be immediately explored and recommended certain activities be started.

The report of the Strategic Intelligence Unit shows that the Unit began its work by seeking to determine whether or not interdisciplinary discussions could be developed and carried forward. The Unit succeeded in developing a sound basis for inter-disciplinary examination of problems associated with vocational and technical education.

Recommendations were developed for educational research, for educational programs, and for possible integration of these.

First, educational programs might be integrated from the cradle to the grave with opportunity for work entry and re-entry at key points along the span of human life if the ideal of democratic education is to be pursued effectively. Second, vocational and technical education might be made an integral part of this total process. Third, policy makers and decision makers for the educational system and its structure need to be so selected that they are complementing the objectives and goals which society has for the institutional structure which performs the function of education for the individuals in this democratic society.

From these recommendations one recognizes major components of problems of conceptualizing education both as a democratic institution and as a democratic function. Logically, one needs an explicit policy which has multiple goals because of the variety of variables.

The Unit explored ways to integrate relevant findings with institutionalized vocational and technical education for innovation and program development and decided that working through Research Coordinating Units, State Departments of Public Instruction, and governmental and private agencies for action and for dissemination of information would be the future course to follow as specific findings were available.

The Strategic Intelligence Unit developed a background of conceptualization of problems of education with emphasis on the problem domain of vocational and technical education. With much effort and energy the Unit worked in an inter-disciplinary fashion across disciplines and as a group, not as a collection of individuals each charged with a specifically delimited disciplinary area. Objectives of vocational and technical educational activity, problems of achieving objectives, and alternatives to achieving objectives were developed in varying detail by the Unit and its committees. Unit membership encouraged the beginning of certain research.

With its conceptualization of the total problem area surrounding vocational and technical education, and its focus on vocational and technical education, together with emphasis placed on certain research areas to be explored, the Strategic Intelligence Unit fulfilled the task set before it by this project.

B. Research Activities Unit

The Research Activities Unit contained several inter-disciplinary studies of problems of vocational and technical education in non-metropolitan areas.

One project dealt with the decision-making process of school districts regarding bond issues for vocational education and training programs. Since vocational education and training programs are of no value unless accepted and implemented by school districts, and since little is known about the process of local school district decision making regarding bond issues and the crucial variables that determine final decisions regarding implementation of training programs, this project explored the decision making process.

The objectives of the study were to (1) analyze the decision making process of the school districts regarding vocational education training programs; (2) to determine crucial variables related to the "success-failure" continuum of proposed vocational education and training programs of school districts, and (3) to make recommendations on the strategies for social action to secure positive decisions by school districts on recommended vocational education and training programs.

The procedure was to develop a conceptual model, and operational measures necessary for the field work. This was followed by collection of data from school districts submitting bond issues to the public in the past five years.

Data obtained from 195 school bond issues in Iowa during the past five years was analyzed in two ways: (1) data on all variables which were conceptualized as being potentially related to the passing or failing of a school bond issue were coded and analyzed. These variables were tested and analyzed for significant differences.

Also examined were occupational problems and vocational training needs of high school dropouts from rural areas in Iowa. This project (1) identified several factors and combinations of factors responsible for dropouts; (2) identified some job skill deficiencies in training needs for dropouts, and (3) used this and other information to suggest a basis for curriculum adjustment, improved guidance, and other changes.

Interrelationships of home environment and employment were studies.

The objectives here were to identify characteristics of home environment related to successful employment of skilled or semi-skilled workers.

The procedure used was to interview selected employers

including foremen, personnel officers, union officials, representatives of the Employment Security Commission, and welfare workers to seek identification of home environment characteristics needed in successful employment of skilled and semi-skilled workers. The sample was limited to male workers. Individuals were selected who were married, who had one to four children and who were residents of non-metropolitan areas.

Interviews with wives of workers were held to obtain data on home environment.

Manpower requirements and demand in agriculture by regions and nationally, with estimation of vocational training and educational needs and productivity was taken up by a group of research personnel.

In estimating the work force and skill requirements in agriculture, the study must also estimate the future migration of labor and of population from agriculture and the manner in which vocational and technical education of the rural community can be adapted so that this education serves both those who stay on the farms and those who leave. Though technical and vocational needs have changed rapidly in the past, the next 15 years will see more rapid change. The skill and knowledge needs of agriculture will change greatly because the number of farms will shrink almost by one-half in the next decade and because the farming industry will become more highly specialized. Managers will be engaged in scientific decision-making in a highly technical and precise farming process. Skilled workers will serve as hired help, but will need technical abilities beyond the requirements of the typical farm operator-laborer of the previous generation. With a rapidly growing scientific orientation of farming in the period ahead, persons in the agri-business sector of the rural community will need much greater and more sophisticated scientific and technical training for farming. These people will be called upon to aid and assist the farmer and hence, must have a highly specialized training.

Examination of ways to predict change in technology, jobs and vocational training needs in non-metropolitan labor markets was undertaken. Objectives of this study were to design a model to predict changes in job opportunities and vocational training needs in rural labor markets which would fit the framework of a functional economic area. Short run demands for labor, the shifts in demand, and vocational training needs were the principal concerns. This study used a questionnaire to get at the demands and training requirements.

An examination of potential contributions of psychology to inter-disciplinary research in vocational and technical education was started. The objectives of this study were (1) to determine the role of psychologists in inter-disciplinary research in vocational and technical education; (2) to formulate a basic conception of the role of the psychologist in an interdisciplinary research program in vocational and technical education for non-metropolitan areas, and (3) to work with staff members in the development of specific research proposals to coordinate efforts for maximum efficiency.

The procedure followed was first a review of literature concerning psychological research related to vocational-technical education. This was followed by delineation of specific aspects of vocational and technical education on which psychologists and their research efforts might be focused.

Exploration began on determinants of the post-high school educational and occupational choices of Iowa farm boys. This study was designed (1) to add knowledge of the process and of the determinants of post-high school educational and occupational choices of farm boys; (2) to find the obstacles which prevent further investment in training and education; (3) to analyze variables determining these plans, and (4) to relate these plans to past experiences.

Research which analyzed legal and political problems and the strategy necessary for implementing programs under the Vocational Education Act of 1963 was also started. This project sought answers to questions regarding how any government allocates its limited resources with respect to education and questions of why resources are allocated as they are. The initial institutional focus would be upon the state law and legislative process. To be examined were present laws and administration of vocational-technical educational programs, their leadership, and their organization.

C. Project Summary

The Strategic Intelligence Unit and the Research Activities Unit were the two main components funded under this project for research and development in problems of vocational and technical education for non-metropolitan areas. Problem conceptualizations and inter-disciplinary research were the activities of these project components.

The primary function of the Strategic Intelligence Unit

was to provide information regarding vocational and technical education for adequate perception of the present situation and of prospective changes for the future. For this are needed estimates of the present and future environment and problem situations into which vocational and technical education in the United States is now cast and into which it will move. This perception of the present and future is believed to be required in order to alleviate crises in the near future.

The Strategic Intelligence Unit of this project was concerned with perception, assessment, and articulation of the existing social milieu as it impinges upon vocational and technical education.

The Research Activities Unit was designed to carry out significant research on problems related to vocational and technical education for non-metropolitan areas. This research activity was conducted primarily in three research areas: (1) human resource development, (2) occupational opportunities assessment, and (3) educational resources development and training. This Unit, headed by Dr. John P. Mahlstede, consisted of eight research activities concerned with human resources development, occupational opportunities, and educational resources development and training needs.

The Strategic Intelligence Unit, which conceptualized components of problem areas surrounding vocational-technical education, and the Research Activities Unit, which conducted eight research activities, formed the organizational structure and working mechanism of this project for research and development in vocational and technical education for non-metropolitan areas.

VII. REFERENCES

1. Bauder, Ward W., and Burchinal, Lee G. "Farm Migrants and Family Aid," Iowa Farm Science. XIX, No. 9, March 1965. p. 10-12.

2. Bauder, Ward W.; and Burchinal, Lee G. Farm Migrants to the City. Research Bulletin No. 534, Agricultural and Home Economics Experiment Station, Iowa State University, Ames, Iowa. March 1965. 55 p.

3. Bauder, Ward W.; and Kenkel, William F. Effects of Migration on the Open-Country Population of Iowa, 1950-1961. Research Bulletin No. 536, Agricultural and Home Economics Experiment Station, Iowa State University, Ames, Iowa. May 1965. 48 p.

4. Beal, George M. "Communities with Declining Populations," Family Mobility in Our Dynamic Society. Ames, Iowa: Iowa State University Press. 1965. p. 186-187.

5. Bogan, Forrest A. "Employment of High School Graduates and Dropouts in 1964," Monthly Labor Review. June 1965. p. 637-642.

6. Bundy, Clarence. State Survey of Farmer Replacement Needs for the State of Iowa. Unpublished report, Department of Vocational Education, Iowa State University, Ames, Iowa. March 1966. 44 p.

7. Bundy, Clarence. What Programs of Instruction Should Post-High School Institutions Provide for Young People Who Will Likely Be Employed in States Other Than Iowa? Unpublished report, Department of Vocational Education, Iowa State University, Ames, Iowa. February 1966. 24p.

8. Burchinal, Lee G. (Editor). Rural Youth in Crises: Facts, Myths and Social Change. U.S. Department of Health, Education and Welfare, Welfare Administration, Washington, D.C. 1963. 401p.

9. Cogley, John (Editor). On Co-existence. New York: The Center for Study of Democratic Institutions, Fund for the Republic. 1965. 22p.

10. Doerflinger, Jon and Klimek, Ronald. Iowa's Population: Recent Trends, Future Prospects. Financing Our Public Services, Special Report No. 47, Agricultural and Home Economics Experiment Station and Cooperative Extension Service, Iowa State University of Science and Technology, Ames, Iowa. May 1966. 22p.

11. Fabricant, Solomon. Basic Facts on Productivity Change. Occasional Paper No. 63. New York: National Bureau of Economic Research Incorporated. 1959. 49 p.

12. Feldt, Leonard S. Relationship Between Pupil Achievement and the High School Size. Unpublished report, College of Education, State University of Iowa, Iowa City, Iowa. 1960. 26 p.

13. Heady, Earl O. Agricultural Policy Under Economic Development. Ames, Iowa: Iowa State University Press. 1963. 682p.

14. Heady, Earl O.; and Tweeten, Luther G. Resource Demand and Structure in Agricultural Industry. Ames, Iowa: Iowa State University Press. 515p.

15. Hoffman, Hallock (Editor). On the World Community. New York: The Center for Study of Democratic Institutions, Fund for the Republic. 1965. 24p.

16. Hutchins, Robert M. (Editor). To Live as Men: An Anatomy of Peace. New York: The Center for Study of Democratic Institutions, Fund for the Republic. 1965. 31p.

17. Jakubauskas, Edward B. Job Opportunities for Iowa's Youth. Financing Our Public Services, Special Report No. 46, Agricultural and Home Economics Experiment Station and Cooperative Extension Service, Iowa State University of Science and Technology, Ames, Iowa. February 1966. 17p.

18. Jakubauskas, Edward B.; and Thomas, Robert W. Graphic Appendix to Job Opportunities for Iowa's Youth. Financing Our Public Services, Pamphlet 327, Cooperative Extension Service, Iowa State University of Science and Technology, Ames, Iowa. July 1966. 12p.

19. Kahler, Alan A. Competencies in Agriculture Needed by Males Employed in Retail Farm Machinery Distribution. Unpublished report, Department of Education, Iowa State University, Ames, Iowa. 1964. 37p.

20. Keyserling, Leon H. The Role of Wages in a Great Society. Washington D.C.: Conference on Economic Progress. February 1966. 137p.

21. Kiplinger Service. "Tomorrow's Jobs: Where the Best Will Be," Changing Times. February 1966. p.7-11.

22. Krietlow, B. W. Long-term Study of Educational Effectiveness of Newly Formed Centralized School Districts in Rural Areas. Madison, Wisconsin: University of Wisconsin. 1962. 77p.

23. Mangum, Fred A. "Job Opportunities in a Growing Economy," Conference on Developing Human Resources for Economic Growth. Raleigh, N.C.: North Carolina State University. October 1965. 17p.

24. Pauling, Linus (Editor). On the Developed and the Developing. New York: The Center for Study of Democratic Institutions, Fund for the Republic. 1965. 17p.

25. Robinson, Richard Ted. Factors Related to the Occupations of Iowa Farm Male High School Graduates. Unpublished report, Department of Education, Iowa State University, Ames, Iowa. 1964. 133p.

26. Schultz, T. W. "Reflections on Public Approaches to Minimize Poverty," Conference on Poverty Amidst Affluence. Morgantown, West Virginia: West Virginia University. April 1965. 14p.

27. Schultz, T. W. "Underinvestment in the Quality of Schooling: The Rural Farm Areas," Investment in Human Capital. Chicago: University of Chicago. 1964. 23p.

28. State of Iowa Department of Public Instruction. Education Beyond High School Age: The Community College. Des Moines, Iowa: The Iowa State Department of Public Instruction. 1962. 115p.

29. Stone, Jack I. Education in the Upper Midwest Economies. Minneapolis: University of Minnesota. 1964. 55p.

30. Tolley, G. S., and Hjort, H. W. "Age-Mobility and Southern Farmer Skill--Looking Ahead for Area Development," Journal of Farm Economics. VL, No. 1, p.31-46.

31. U.S. Bureau of the Census. Statistical Abstract of the United States: 1964. (85th edition). Washington D.C.: U.S. Government Printing Office. 1964. 1041p.

32. U.S. Bureau of the Census. Statistical Abstract of the United States: 1965. (86th edition). Washington D.C.: U.S. Government Printing Office. 1965. 1047p.

33. U.S. Department of Health, Education and Welfare. Education for a Changing World of Work," Consultants on Vocational Education. Washington D.C.: U.S. Government Printing Office. 1964. 33p.

34. U.S. Office of Statistical Standards. Standard Metropolitan Statistical Areas. Washington D.C.: U.S. Government Printing Office. 1959. 7p.

35. Van Dyke, L. A.; and Hoyt, K. B. The Dropout Problem in Iowa High Schools. Iowa City, Iowa: The State University of Iowa. 1958. 88p.

36. Winkelmann, Don. Cost of Public Education in Iowa. Financing Our Public Services, Special Report No. 44, Agricultural and Home Economics Experiment Station and Cooperative Extension Service, Iowa State University of Science and Technology, Ames, Iowa. February 1965. 27p.